

This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1-10. (canceled)

11. (currently amended) An audio/visual system ~~according to claim 10~~, comprising:  
at least one output component having at least one source port for each type of output  
signal output from the at least one output component and at least one source port object for  
each of said at least one source port;  
at least one input component having at least one sink port for each type of input signal  
input to the at least one input component and at least one sink port object for each at least one  
sink port, wherein each at least one source port of said at least one output component is  
connectable to said at least one sink port of said at least one input component via at least one  
primitive circuit path;  
at least one primitive circuit object for each at least one primitive circuit path with a  
signal at least one of (A) originating from a source port and (B) terminating at a sink port,  
wherein a virtual circuit object includes at least one reference to at least one primitive circuit  
object and each virtual circuit object contains primitive binding information corresponding to  
at least one virtual circuit path associated with the virtual circuit object; and  
wherein each output associated with a virtual circuit object outputs a stream of  
signals, the signals within the stream are hierarchically organized according to how source  
ports are organized within a complete source port, whereby the system represents the stream  
of an output component by a stream object.

12. (previously presented) An audio/visual system according to claim 11, wherein a  
stream object includes at least one of (A) at least one other stream object and (B) at least one  
child stream object, wherein a stream object that does not contain other stream objects is a  
primitive stream object and a stream object that is not contained in other stream objects is a  
complete stream object and whereby each primitive stream object includes a signal object  
that corresponds to the signal that is output by at least one of (A) the corresponding source  
port and (B) the corresponding output switching port.

13-18. (canceled)

19. (currently amended) An audio/visual system ~~according to claim 2~~, comprising:  
at least one output component having at least one source port for each type of output  
signal output from the at least one output component and at least one source port object for  
each of said at least one source port;  
at least one input component having at least one sink port for each type of input signal  
input to the at least one input component and at least one sink port object for each at least one  
sink port, wherein each at least one source port of said at least one output component is  
connectable to said at least one sink port of said at least one input component via at least one  
primitive circuit path;  
at least one primitive circuit object for each at least one primitive circuit path with a  
signal at least one of (A) originating from a source port and (B) terminating at a sink port;  
and  
wherein said at least one primitive circuit object is of a primitive circuit object class,  
and member functions of said primitive circuit object class include at least one of a function  
that returns a reference to the primitive source port of a primitive circuit and a function that  
returns a reference to the primitive sink port of a primitive circuit.

20. (currently amended) An audio/visual system ~~according to claim 10~~, comprising:  
at least one output component having at least one source port for each type of output  
signal output from the at least one output component and at least one source port object for  
each of said at least one source port;  
at least one input component having at least one sink port for each type of input signal  
input to the at least one input component and at least one sink port object for each at least one  
sink port, wherein each at least one source port of said at least one output component is  
connectable to said at least one sink port of said at least one input component via at least one  
primitive circuit path;  
at least one primitive circuit object for each at least one primitive circuit path with a  
signal at least one of (A) originating from a source port and (B) terminating at a sink port,  
wherein a virtual circuit object includes at least one reference to at least one primitive circuit  
object and each virtual circuit object contains primitive binding information corresponding to  
at least one virtual circuit path associated with the virtual circuit object; and

wherein said virtual circuit object is of a virtual circuit object class, and member functions of said virtual circuit object class include at least one of a function that returns a reference to a complete source port that is producing the signals being routed by the subject virtual circuit, a function that returns a reference to a complete sink port that is receiving the signals being routed by the virtual circuit, a function that returns the number of bindings between primitive source ports and primitive sink ports for the designated virtual connection and a function that returns the designated numbered binding as a reference to the associated primitive source port and a reference to the associated primitive sink port.

21. (previously presented) An audio/visual system according to claim 11, wherein signals within a stream are of a signal class, wherein member functions of the signal class include at least one of (A) a function that returns the intended usage of the requesting signal, (B) a function that returns the format of the requesting signal, (C) a function that returns a reference to the stream which is the parent of the signal and (D) a function that returns a reference to the primitive source port that is outputting the signal.

22. (previously presented) An audio/visual system according to claim 21, wherein member functions include properties of the signal class.

23. (previously presented) An audio/visual system according to claim 11, wherein a stream is of a stream class, wherein member functions of the stream class includes at least one of a function that enables the enumeration of at least one child stream and a function that enables the retrieval of at least one child stream.

24. (previously presented) An audio/visual system according to claim 23, wherein a stream is of a stream class, wherein member functions of the stream class include at least one of (A) a function that returns an indication as to whether a stream is a complete stream, (B) a function that returns an indication as to whether a stream is a primitive stream, (C) a function that returns a reference to the stream that is the parent of a stream, (D) a function that returns the number of child streams of a stream, (E) a function that returns a reference to the designated numbered child stream of a stream, (F) a function that returns a reference to the source port that is producing a stream, (G) a function that returns a reference to the source

program that is producing a stream and (H) a function that returns a reference to a signal in a stream.

25-33. (canceled)

34. (currently amended) An audio/visual system ~~according to claim 32~~, comprising:

at least one output component having at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

at least one input component having at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port, wherein each at least one source port of said at least one output component is connectable to said at least one sink port of said at least one input component via at least one primitive circuit path;

at least one entertainment session;

at least one player/recorder component associated with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object; and

wherein an entertainment session of said at least one entertainment session provides a behavior that allows an audio/visual program to be assigned to a player/recorder component, and whereby when an audio/visual program is assigned to an entertainment session, the entertainment session loads the audio/visual program into a player/recorder, causes the program to be played by the player/recorder and routes at least one output signal of the player/recorder component to at least one associated output component.

35. (previously presented) An audio/visual system according to claim 34, wherein said loading of the audio/visual program into a player/recorder by said entertainment session includes at least one of (A) instantiating the audio/visual program on a player/recorder and (B) resolving the audio/visual program to a player/recorder appropriate for the audio/visual program.

36-37. (canceled)

38. (previously presented) An audio/visual system according to claim 34, wherein a space object is associated with each entertainment session designating its space, a player/recorder object is associated with each player/recorder component.

39. (previously presented) An audio/visual system according to claim 34, wherein an entertainment session includes at least one default output component, such that when an audio/visual program is assigned to the entertainment session, the at least one output signal for the player/recorder component is routed to at least one default output component.

40. (previously presented) An audio/visual system according to claim 34, wherein an entertainment session creates at least one virtual circuit to route said audio/visual program from said player/recorder component and to said at least one output component.

41. (previously presented) An audio/visual system according to claim 34, wherein an entertainment session at least one of dynamically creates at least one virtual circuit to route said audio/visual program to a plurality of output components and dynamically destroys at least one existing virtual circuit no longer needed to route said audio/visual program.

42. (previously presented) An audio/visual system according to claim 34, wherein said entertainment session provides said behavior in response to an external action in said system.

43. (previously presented) An audio/visual system according to claim 34, wherein, for each of its associated output components, an entertainment session at least one of (A) determines whether the routing of the audio/visual program is possible, (B) is notified of an action external to the entertainment session and (C) determines whether to provide a user interface for controlling the at least one output component to which the at least one signal is routed.

44. (previously presented) An audio/visual system according to claim 43, wherein when the entertainment session is notified that one of its output components has been activated due to an external action, the entertainment session becomes an additional controller of the player/recorder component outputting to the output component.

45. (previously presented) An audio/visual system according to claim 43, wherein said action external to the entertainment session includes a physical load of an audio/visual program into a physical device.
46. (previously presented) An audio/visual system according to claim 34, wherein an entertainment session provides a property notification when a property of one of an associated player/recorder component and associated output component changes.
47. (previously presented) An audio/visual system according to claim 46, wherein said providing of a property notification includes notifying a user interface component corresponding to the at least one player/recorder component and output component.
48. (previously presented) An audio/visual system according to claim 34, wherein an entertainment session provides a user interface component for controlling at least one user interface of at least one of (A) at least one input component and (B) at least one output component associated with the entertainment session.
49. (previously presented) An audio/visual system according to claim 34, wherein a player/recorder object has at least one associated complete source port object and has at least one associated complete sink port object and wherein each output component has at least one associated complete sink port and wherein the player/recorder object provides a behavior at least one of (A) to load an audio/visual program into a player/recorder component, (B) to allow at least one command to be sent to the player/recorder component, (C) to determine whether it is possible to load an audio/visual program into the player/recorder component and (D) to provide custom behavior customized to the corresponding player/recorder component.
50. (previously presented) An audio/visual system according to claim 34, wherein an output component has a type and an output component provides at least one of (A) a behavior that returns the identification of a sink port object that is appropriate for assigning the signals to the output component for a specified stream object, (B) a behavior that is specific to the type of output component, wherein the behavior is one of (a) part of the base object class and (b) provided through a derivation of that base object class.

51. (previously presented) An audio/visual system according to claim 34, further comprising:

a program pool data structure hierarchically representing a set of audio/visual program entries, whereby each audio/visual program entry has a corresponding program pool data structure.

52. (previously presented) An audio/visual system according to claim 51, wherein an audio/visual program entry includes an audio/visual program object.

53. (previously presented) An audio/visual system according to claim 51, wherein an audio visual program entry includes a program type and program types include (A) broadcast program (B) single access physical media and (C) multiple access media.

54. (previously presented) An audio/visual system according to claim 53, wherein an audio/visual program entry includes a program type, and wherein possible program types include a tuner type, a tape machine type, a compact disk player type, a laser disk player type, a removable disk drive type, a hard drive type, a video cassette recorder type, a digital versatile disk player type, a video game system type, a JPEG image type, a streaming media type and a computing device type.

55. (previously presented) An audio/visual system according to claim 34, wherein an audio/visual program entry includes at least one child program object, and wherein said at least one child program object is hierarchically organized.

56. (previously presented) An audio/visual system according to claim 34, wherein a program pool data structure at least one of (A) provides a behavior to browse through the hierarchy of the audio/visual program entries represented by the program pool data structure, (B) allows a player/recorder component to be assigned to an audio/visual program entry of the program pool data structure, (C) provides a behavior corresponding to the loading of an audio/visual program entry into a player/recorder component and (D) allows an entertainment session to be created by a session manager.

57. (previously presented) An audio/visual system according to claim 56, wherein said providing of a behavior corresponding to the loading of an audio/visual program entry

includes at least one of (A) instantiating the audio/visual program corresponding to the audio/visual program entry on a player/recorder and (B) resolving the audio/visual program corresponding to the audio/visual program entry to a player/recorder appropriate for the audio/visual program.

58. (previously presented) An audio/visual system according to claim 34, wherein an audio/visual program entry includes the identifier of an owner of the audio/visual program entry.

59. (previously presented) An audio/visual system according to claim 58, wherein the owner is one of (A) a second audio/visual program entry and (B) the program pool data structure that includes the audio/visual program entry.

60. (previously presented) An audio/visual system according to claim 59, wherein an audio/visual program entry at least one of (A) allows for the retrieving of its child program objects, (B) allows for the retrieving of its parent program object of which the audio/visual program entry is a child program object and (C) enables the establishment of at least one criterion so that only child program objects that match the at least one criterion are returned.

61. (previously presented) An audio/visual system according to claim 60, wherein a parent program object of an audio/visual program entry is retrieved via the associated program pool data structure by providing the location of the audio/visual program entry to the program pool data structure.

62. (previously presented) An audio/visual system according to claim 34, further comprising:

a program pool data structure hierarchically representing a set of audio/visual program entries, whereby each audio/visual program entry has a corresponding program pool data structure.

63. (previously presented) An audio/visual system according to claim 62, wherein an audio/visual program entry includes a program identification (ID), which provides descriptive information about the audio/visual program represented by the audio/visual program entry.



64. (previously presented) An audio/visual system according to claim 63, wherein said descriptive information includes at least one of a name associated with the audio/visual program, a time associated with the audio/visual program, a volume associated with the audio/visual program, a genre associated with the audio/visual program and a format associated with the audio/visual program.

65. (previously presented) An audio/visual system according to claim 64, wherein said descriptive information includes at least one location of at least one medium that corresponds to the audio/visual program.

66. (previously presented) An audio/visual system according to claim 65, wherein a location is represented as a path within a hierarchy of locations.

67. (previously presented) An audio/visual system according to claim 63, wherein an audio/visual program entry has an associated program type, which specifies a path through a hierarchy of program types.

68. (previously presented) An audio/visual system according to claim 63, wherein functions of components of the audio/visual system resolve a program ID into a plurality of different types of references including (A) a get program object function that resolves a program ID into a reference to a corresponding audio/visual program entry, (B) a get program genre function that resolves a program ID into a plurality of references to a set of audio/visual program entries in the same genre.

69. (previously presented) An audio/visual system according to claim 68, wherein the get program genre function causes the audio/visual program entry associated with the program ID to retrieve information relating its genre.

70. (previously presented) An audio/visual system according to claim 34, wherein an audio/visual program entry exposes an interface for maintenance of state of the audio/visual program entry including at least one of (A) an interface for one of adding and deleting a property of the audio/visual program entry, (B) an interface for setting a property of the audio/visual program entry, (C) an interface for one of adding and deleting a child program

object of the audio/visual program entry and (D) an interface for deleting of the audio/visual program entry itself.

71. (previously presented) An audio/visual system according to claim 70, wherein an interface is specific to the type of audio/visual program represented by the audio/visual program entry.

72. (previously presented) An audio/visual system according to claim 34, wherein a program pool data structure provides an access port for each client that is accessing the program pool and wherein the program pool data structure exposes a function that receives a program ID and returns a reference to an audio/visual program entry corresponding to that program ID.

73. (previously presented) An audio/visual system according to claim 34, wherein a program pool data structure allows for database cursor-like access to the program objects, whereby when a query is submitted to the program pool data structure which specifies at least one criterion for audio/visual program entries, the program objects of the program pool data structure that match the at least one criterion are provided in a result set accessible to the client.

74. (previously presented) An audio/visual system according to claim 73, wherein a partial list of program objects that match the at least one criterion are provided in a result set while query continues to be processed.

75. (previously presented) An audio/visual system according to claim 73, wherein a client accesses the result set using at least one of (A) a function to advance to the next program object in the result set, (B) a get reference function for the current program object which returns a reference to the current program object of the result set and (C) a return a set of references function for the program objects in the result set that returns a set of references to the program objects.

76. (previously presented) An audio/visual system according to claim 73, wherein the result set of a query is cached at a client and wherein the program pool data structure

automatically updates the client's cache as the set of programs that match the at least one criterion changes.

77. (previously presented) An audio/visual system according to claim 75, wherein the program pool data structure provides an access control mechanism to restrict access by an enumerated client.

78-88. (canceled)

89. (currently amended) An audio/visual system ~~according to claim 32~~, comprising:  
at least one output component having at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;  
at least one input component having at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port, wherein each at least one source port of said at least one output component is connectable to said at least one sink port of said at least one input component via at least one primitive circuit path;  
at least one entertainment session;  
at least one player/recorder component associated with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object;  
wherein the process of assigning of a program to an entertainment session includes  
[[::]] invoking a function to select an audio/visual program entry thereby returning a reference to the audio/visual program entry; and  
invoking a set current program function of the entertainment session object passing the reference to the audio/visual program entry.

90-93. (canceled)

94. (currently amended) An audio/visual system ~~according to claim 32~~, comprising:  
at least one output component having at least one source port for each type of output signal output from the at least one output component and at least one source port object for

each of said at least one source port;

at least one input component having at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port, wherein each at least one source port of said at least one output component is connectable to said at least one sink port of said at least one input component via at least one primitive circuit path;

at least one entertainment session;

at least one player/recorder component associated with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object; and

wherein invoking the set current program function of an entertainment session object passes a reference to an audio/visual program entry thereby loading that audio/visual program entry within the entertainment session.

95. (previously presented) An audio/visual system according to claim 94, wherein said invoking includes:

invoking a function to retrieve a loaded player/recorder object;  
passing a reference to the audio/visual program entry; and  
returning a reference to a player/recorder object that is loaded with the program.

96. (previously presented) An audio/visual system according to claim 95, further including:

invoking a get current source function of the player/recorder object, thereby returning a reference to a complete source port for the player/recorder object; and  
invoking a get stream reference function of the source port object to retrieve a reference to a complete stream for the source port object.

97. (previously presented) An audio/visual system according to claim 96, further including:

looping while selecting at least one output component associated with the entertainment session; and

creating a virtual circuit from the player/recorder component to each of the output components.

98. (previously presented) An audio/visual system according to claim 97, wherein said looping includes at least one of synchronous looping and asynchronous looping.

99. (previously presented) An audio/visual system according to claim 97, wherein said looping includes:

requesting a selected output component to return a sink port object that is appropriate to the type of stream;

invoking a get sink port function of the output object corresponding to the selected output component; and

invoking a create virtual circuit function of the source port object passing a reference to the sink port object, thereby creating a virtual circuit from the source port to the sink port.

100. (currently amended) An audio/visual system ~~according to claim 32~~, comprising:

at least one output component having at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

at least one input component having at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port, wherein each at least one source port of said at least one output component is connectable to said at least one sink port of said at least one input component via at least one primitive circuit path;

at least one entertainment session;

at least one player/recorder component associated with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object;

wherein the entertainment session includes a load program function to retrieve a loaded player/recorder object, which passes a reference to an audio/visual program entry and returns a reference that has been allocated to a player/recorder object, said load program includes [[:]] retrieving the location information from the audio/visual program entry;

if the location information indicates that a player/recorder component is associated with the audio/visual program entry, invoking a load function of the audio/visual program entry and receiving a reference to a loaded player/recorder object in return; and

if the location information indicates that a player/recorder component is not already associated with the audio/visual program entry, receiving a reference to the loaded player/recorder object.

101. (previously presented) An audio/visual system according to claim 100, further including:

retrieving a player/recorder object that is appropriate to an associated entertainment session; and

invoking a load program function of the player/recorder object passing the reference to the audio/visual program entry.

102. (previously presented) An audio/visual system according to claim 101, wherein the load function of the player/recorder object includes:

invoking a load program function of the media manager object passing a reference to the audio/visual program entry, receiving a reference to a player/recorder object in return; and

invoking the load program function of the player/recorder object passing the program reference.

103. (previously presented) An audio/visual system according to claim 100, wherein the load program function of a player/recorder object, which is passed a reference to an audio/visual program entry and effects the loading of the program into that player/recorder component includes:

identifying a complete source port of the player/recorder component that is appropriate for the passed program;

assigning the audio/visual program entry to the player/recorder object;

determining at least one of the usage, format and port type for the primitive ports of the selected source port;

invoking a set signal function of the complete source port passing said at least one of the usage, format and port type, thereby setting the usage, format and port type for each

primitive source port; and

notifying the audio/visual program entry that it has been loaded.

104. (previously presented) An audio/visual system according to claim 102, wherein the load program function of a media manager object, which is performed when the media manager object has at least one child media manager object, includes:

passing a reference to an audio/visual program entry and returning a reference to a player/recorder object;

invoking a get location function of the audio/visual program entry to retrieve location information from the audio/visual program entry;

searching a location table for a media manager object that manages the media corresponding to the audio/visual program entry; and

invoking the load program function of the located media manager object.

105. (previously presented) An audio/visual system according to claim 102, wherein the load program function of a media manager object, which is performed when the media manager object has zero child media manager objects, includes:

retrieving location information from the audio/visual program entry and automatically finding the media associated with the location information;

initializing an appropriate object for the media; and

setting a return reference to the appropriate object.

106-107. (canceled)

108. (currently amended) A method according to claim 106, further including: for establishing a path between a source component and an input component in an audio/visual system comprising at least one source component having at least one source port capable of supporting each type of output signal output from the at least one source component and at least one primitive source port object for each of said at least one source port; and at least one input component having at least one sink port capable of supporting each type of input signal input to the at least one input component and a primitive sink port object for each sink port, wherein each at least one source port of said at least one source component is connectable to said at least one sink port of said at least one input component via at least one primitive

circuit path, including:

instantiating a virtual circuit object that establishes a path between the source port corresponding to the complete source port object and the sink port corresponding to the complete sink port object;

requesting the output object to provide a reference to a complete source port object;  
requesting the complete source port object to provide a reference to its corresponding complete stream object; and  
requesting the input object to provide a reference to its corresponding complete sink port object.

109-110. (canceled)

111. (currently amended) A method ~~according to claim 106, wherein said method further includes:~~ for establishing a path between a source component and an input component in an audio/visual system comprising at least one source component having at least one source port capable of supporting each type of output signal output from the at least one source component and at least one primitive source port object for each of said at least one source port; and at least one input component having at least one sink port capable of supporting each type of input signal input to the at least one input component and a primitive sink port object for each sink port, wherein each at least one source port of said at least one source component is connectable to said at least one sink port of said at least one input component via at least one primitive circuit path, including:

instantiating a virtual circuit object that establishes a path between the source port corresponding to the complete source port object and the sink port corresponding to the complete sink port object;

invoking a create virtual circuit function wherein said invoking includes passing a reference to the sink port object;

in response to said invoking, constructing a new virtual circuit object wherein said constructing includes passing to a constructor a reference to the source port object and a reference to the sink port object; and

adding the new virtual circuit object to a list of virtual circuits associated with the source port object.



112. (previously presented) A method according to claim 111, wherein said constructing of the new virtual circuit object includes:

- retrieving by the constructor a reference to the stream associated with the source port object;

- assigning the stream by the constructor to the sink port object by invoking an assign stream function of the sink port object passing a reference to the stream object, thereby returning the number of signal objects within the stream object that are assigned to the complete sink port object; and

- creating a primitive binding object for each signal object that is assigned to the sink port object.

113. (previously presented) A method according to claim 112, wherein said creating of a primitive binding object for each signal object includes:

- selecting by the constructor the first signal number, and if the first signal number has been selected, selecting by the constructor the next signal number;

- if the selected number is less than or equal to the number of assigned signals, retrieving by the constructor (A) a reference to the primitive sink port object corresponding to the numbered signal object and (B) a reference to the signal object, wherein said retrieving includes invoking a get assignment reference function of the sink port object;

- retrieving by the constructor a reference to the primitive source port object for the corresponding signal port object;

- retrieving by the constructor a reference to the sink port object of the primitive source port object;

- if the primitive sink port object of the primitive circuit of the primitive sink port object is the same as the primitive sink port object of the primitive circuit of the primitive source port object, directly connecting the source port and the sink port, otherwise, connecting the source port and the sink port through a switching mechanism.

114. (previously presented) A method according to claim 113, wherein if the connection is through a switching mechanism, invoking by the constructor a process-not-direct-connection function; and

- adding by the constructor an identification of a binding from the primitive source port

to the primitive sink port to a binding table of the virtual circuit object, wherein the binding represents the identity of the primitive source port object, the identity of the input switch port object of the switching mechanism, the identity of the output switch port object of the switching mechanism and the identity of the primitive sink port object.

115. (previously presented) A method according to claim 114, wherein said invoking of the process-not-direct-connection function includes:

- retrieving a reference to the switch input port object for the primitive circuit of the primitive source port object;

- retrieving a reference to the primitive source port object;

- retrieving a reference to the output switch port object of the retrieved primitive circuit; and

- creating a connection between the input switch port object and the output switch port object.

116. (previously presented) A method according to claim 113, wherein if the connection is direct,

- adding by the constructor an identification of a binding from the primitive source port to the primitive sink port to a binding table of the virtual circuit object, wherein the binding represents the identity of the primitive source port object and the identity of the primitive sink port object.

117-134. (canceled)

135. (currently amended) A method ~~according to claim 134~~, for use in connection with an audio/visual system, comprising:

- connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

- wherein each of said at least one output component includes at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

- wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port

object for each at least one sink port;

wherein at least one primitive circuit object is generated for each at least one primitive circuit path with a signal at least one of (A) originating from a source port and (B) terminating at a sink port;

wherein a virtual circuit object includes at least one reference to at least one primitive circuit object and each virtual circuit object contains primitive binding information corresponding to at least one virtual circuit path associated with the virtual circuit object; and

further including outputting a stream of signals by each output associated with a virtual circuit object, wherein the signals within the stream are hierarchically organized according to how source ports are organized within a complete source port, whereby the system represents the stream of an output component by a stream object.

136. (previously presented) A method according to claim 135, wherein a stream object includes at least one of (A) at least one other stream object and (B) at least one child stream object, wherein a stream object that does not contain other stream objects is a primitive stream object and a stream object that is not contained in other stream objects is a complete stream object and whereby each primitive stream object includes a signal object that corresponds to the signal that is output by at least one of (A) the corresponding source port and (B) the corresponding output switching port.

137-142. (canceled)

143. (currently amended) A method ~~according to claim 126~~, for use in connection with an audio/visual system, comprising:

connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

wherein each of said at least one output component includes at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port;

wherein at least one primitive circuit object is generated for each at least one primitive circuit path with a signal at least one of (A) originating from a source port and (B) terminating at a sink port; and

wherein said at least one primitive circuit object is of a primitive circuit object class, and member functions of said primitive circuit object class include at least one of a function that returns a reference to the primitive source port of a primitive circuit and a function that returns a reference to the primitive sink port of a primitive circuit.

144. (currently amended) A method ~~according to claim 134~~, for use in connection with an audio/visual system, comprising:

connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

wherein each of said at least one output component includes at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port;

wherein at least one primitive circuit object is generated for each at least one primitive circuit path with a signal at least one of (A) originating from a source port and (B) terminating at a sink port;

wherein a virtual circuit object includes at least one reference to at least one primitive circuit object and each virtual circuit object contains primitive binding information corresponding to at least one virtual circuit path associated with the virtual circuit object; and

wherein said virtual circuit object is of a virtual circuit object class, and member functions of said virtual circuit object class include at least one of a function that returns a reference to a complete source port that is producing the signals being routed by the subject virtual circuit, a function that returns a reference to a complete sink port that is receiving the signals being routed by the virtual circuit, a function that returns the number of bindings between primitive source ports and primitive sink ports for the designated virtual connection

and a function that returns the designated numbered binding as a reference to the associated primitive source port and a reference to the associated primitive sink port.

145. (previously presented) A method according to claim 135, wherein signals within a stream are of a signal class, wherein member functions of the signal class include at least one of (A) a function that returns the intended usage of the requesting signal, (B) a function that returns the format of the requesting signal, (C) a function that returns a reference to the stream which is the parent of the signal and (D) a function that returns a reference to the primitive source port that is outputting the signal.

146. (previously presented) A method according to claim 145, wherein member functions include properties of the signal class.

147. (previously presented) A method according to claim 135, wherein a stream is of a stream class, wherein member functions of the stream class includes at least one of a function that enables the enumeration of at least one child stream and a function that enables the retrieval of at least one child stream.

148. (previously presented) A method according to claim 147, wherein a stream is of a stream class, wherein member functions of the stream class include at least one of (A) a function that returns an indication as to whether a stream is a complete stream, (B) a function that returns an indication as to whether a stream is a primitive stream, (C) a function that returns a reference to the stream that is the parent of a stream, (D) a function that returns the number of child streams of a stream, (E) a function that returns a reference to the designated numbered child stream of a stream, (F) a function that returns a reference to the source port that is producing a stream, (G) a function that returns a reference to the source program that is producing a stream and (H) a function that returns a reference to a signal in a stream.

149-157. (canceled)

158. (currently amended) A method ~~according to claim 156~~, for use in connection with an audio/visual system, comprising:

connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

wherein each of said at least one output component includes at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port;

generating at least one entertainment session;

associating at least one player/recorder component with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object; and

further including providing a behavior by an entertainment session of said at least one entertainment session, wherein the behavior allows an audio/visual program to be assigned to a player/recorder component, and whereby when an audio/visual program is assigned to an entertainment session, further comprising loading the audio/visual program into a player/recorder by the entertainment session, causing the program to be played by the player/recorder and routing at least one output signal of the player/recorder component to at least one associated output component.

159. (previously presented) A method according to claim 158, wherein said loading of the audio/visual program into a player/recorder by said entertainment session includes at least one of (A) instantiating the audio/visual program on a player/recorder and (B) resolving the audio/visual program to a player/recorder appropriate for the audio/visual program.

160-161. (canceled)

162. (previously presented) A method according to claim 158, wherein a space object is associated with each entertainment session designating its space, a player/recorder object is associated with each player/recorder component.

163. (previously presented) A method according to claim 158, wherein an entertainment session includes at least one default output component, such that when an audio/visual program is assigned to the entertainment session, the at least one output signal for the player/recorder component is routed to at least one default output component.

164. (previously presented) A method according to claim 158, further comprising creating by an entertainment session at least one virtual circuit to route said audio/visual program from said player/recorder component and to said at least one output component.

165. (previously presented) A method according to claim 158, further comprising at least one of dynamically creating by an entertainment session at least one virtual circuit to route said audio/visual program to a plurality of output components and dynamically destroying at least one existing virtual circuit no longer needed to route said audio/visual program.

166. (previously presented) A method according to claim 158, wherein said entertainment session provides said behavior in response to an external action in said system.

167. (previously presented) A method according to claim 158, further comprising, for each of its associated output components, at least one of (A) determining by an entertainment session whether the routing of the audio/visual program is possible, (B) notifying an entertainment session of an action external to the entertainment session and (C) determining by an entertainment session whether to provide a user interface for controlling the at least one output component to which the at least one signal is routed.

168. (previously presented) A method according to claim 167, further including the entertainment session becoming an additional controller of a player/recorder component outputting to the output component when the entertainment session is notified that one of its output components has been activated due to an external action.

169. (previously presented) A method according to claim 167, wherein said action external to the entertainment session includes a physical load of an audio/visual program into a physical device.

170. (previously presented) A method according to claim 158, further including providing by an entertainment session a property notification when a property of one of an associated player/recorder component and associated output component changes.

171. (previously presented) A method according to claim 170, wherein said providing of a property notification includes notifying a user interface component corresponding to the at least one player/recorder component and output component.

172. (previously presented) A method according to claim 158, further including providing by an entertainment session a user interface component for controlling at least one user interface of at least one of (A) at least one input component and (B) at least one output component associated with the entertainment session.

173. (previously presented) A method according to claim 158, wherein a player/recorder object has at least one associated complete source port object and has at least one associated complete sink port object and wherein each output component has at least one associated complete sink port and further comprising providing a behavior by the player/recorder object at least one of (A) to load an audio/visual program into a player/recorder component, (B) to allow at least one command to be sent to the player/recorder component, (C) to determine whether it is possible to load an audio/visual program into the player/recorder component and (D) to provide custom behavior customized to the corresponding player/recorder component.

174. (previously presented) A method according to claim 158, wherein an output component has a type and an output component provides at least one of (A) a behavior that returns the identification of a sink port object that is appropriate for assigning the signals to the output component for a specified stream object, (B) a behavior that is specific to the type of output component, wherein the behavior is one of (a) part of the base object class and (b) provided through a derivation of that base object class.

175. (previously presented) A method according to claim 158, further comprising:

generating a program pool data structure hierarchically representing a set of audio/visual program entries, whereby each audio/visual program entry has a corresponding program pool data structure.

176. (previously presented) A method according to claim 175, wherein an audio/visual program entry includes an audio/visual program object.



177. (previously presented) A method according to claim 175, wherein an audio/visual program entry includes a program type and program types include (A) broadcast program (B) single access physical media and (C) multiple access media.

178. (previously presented) A method according to claim 177, wherein an audio/visual program entry includes a program type, and wherein possible program types include a tuner type, a tape machine type, a compact disk player type, a laser disk player type, a removable disk drive type, a hard drive type, a video cassette recorder type, a digital versatile disk player type, a video game system type, a JPEG image type, a streaming media type and a computing device type.

179. (previously presented) A method according to claim 158, wherein an audio/visual program entry includes at least one child program object, and wherein said at least one child program object is hierarchically organized.

180. (previously presented) A method according to claim 158, further comprising at least one of (A) providing by a program pool data structure a behavior to browse through the hierarchy of the audio/visual program entries represented by the program pool data structure, (B) allowing by a program pool data structure a player/recorder component to be assigned to an audio/visual program entry of the program pool data structure, (C) providing by a program pool data structure a behavior corresponding to the loading of an audio/visual program entry into a player/recorder component and (D) allowing by a program pool data structure an entertainment session to be created by a session manager.

181. (previously presented) A method according to claim 180, wherein said providing of a behavior corresponding to the loading of an audio/visual program entry includes at least one of (A) instantiating the audio/visual program corresponding to the audio/visual program entry on a player/recorder and (B) resolving the audio/visual program corresponding to the audio/visual program entry to a player/recorder appropriate for the audio/visual program.

182. (previously presented) A method according to claim 158, wherein an audio/visual program entry includes the identifier of an owner of the audio/visual program entry.

183. (previously presented) A method according to claim 182, wherein the owner is one of (A) a second audio/visual program entry and (B) the program pool data structure that includes the audio/visual program entry.

184. (currently amended) A method according to claim ~~60~~ 158 , further comprising at least one of (A) allowing by an audio/visual program entry for the retrieving of its child program objects, (B) allowing by an audio/visual program entry for the retrieving of its parent program object of which the audio/visual program entry is a child program object and (C) enabling by an audio/visual program entry the establishment of at least one criterion so that only child program objects that match the at least one criterion are returned.

185. (previously presented) A method according to claim 184, further including retrieving by a parent program object an audio/visual program entry, via the associated program pool data structure by providing the location of the audio/visual program entry to the program pool data structure.

186. (previously presented) A method according to claim 158, further comprising:  
generating a program pool data structure hierarchically representing a set of audio/visual program entries, whereby each audio/visual program entry has a corresponding program pool data structure.

187. (previously presented) A method according to claim 186, wherein an audio/visual program entry includes a program identification (ID), which provides descriptive information about the audio/visual program represented by the audio/visual program entry.

188. (previously presented) A method according to claim 187, wherein said descriptive information includes at least one of a name associated with the audio/visual program, a time associated with the audio/visual program, a volume associated with the audio/visual program, a genre associated with the audio/visual program and a format associated with the audio/visual program.

189. (previously presented) A method according to claim 188, wherein said descriptive information includes at least one location of at least one medium that corresponds to the audio/visual program.

190. (previously presented) A method according to claim 189, wherein a location is represented as a path within a hierarchy of locations.

191. (previously presented) A method according to claim 187, wherein an audio/visual program entry has an associated program type, which specifies a path through a hierarchy of program types.

192. (previously presented) A method according to claim 187, wherein functions of components of the audio/visual system resolve a program ID into a plurality of different types of references including (A) a get program object function that resolves a program ID into a reference to a corresponding audio/visual program entry, (B) a get program genre function that resolves a program ID into a plurality of references to a set of audio/visual program entries in the same genre.

193. (previously presented) A method according to claim 192, further including causing via the get program genre function the audio/visual program entry associated with the program ID to retrieve information relating its genre.

194. (previously presented) A method according to claim 158, further including exposing by an audio/visual program entry an interface for maintenance of state of the audio/visual program entry including at least one of (A) an interface for one of adding and deleting a property of the audio/visual program entry, (B) an interface for setting a property of the audio/visual program entry, (C) an interface for one of adding and deleting a child program object of the audio/visual program entry and (D) an interface for deleting of the audio/visual program entry itself.

195. (previously presented) A method according to claim 194, wherein an interface is specific to the type of audio/visual program represented by the audio/visual program entry.

196. (previously presented) A method according to claim 158, further including providing by a program pool data structure an access port for each client that is accessing the program pool and wherein the program pool data structure exposes a function that receives a program ID and returns a reference to an audio/visual program entry corresponding to that program ID.

197. (previously presented) A method according to claim 158, further comprising providing by a program pool data structure for database cursor-like access to the program objects, and providing the program objects of the program pool data structure that match the at least one criterion in a result set accessible to the client when a query is submitted to the program pool data structure which specifies at least one criterion for audio/visual program entries.

198. (previously presented) A method according to claim 197, wherein said providing includes providing a partial list of program objects that match the at least one criterion in a result set while query continues to be processed.

199. (previously presented) A method according to claim 197, further comprising accessing by a client the result set using at least one of (A) a function to advance to the next program object in the result set, (B) a get reference function for the current program object which returns a reference to the current program object of the result set and (C) a return a set of references function for the program objects in the result set that returns a set of references to the program objects.

200. (previously presented) A method according to claim 197, further comprising caching the result set of a query at a client and automatically updating by the program pool data structure the client's cache as the set of programs that match the at least one criterion changes.

201. (previously presented) A method according to claim 200, wherein said accessing includes providing by the program pool data structure an access control mechanism to restrict access by an enumerated client.

202-212. (canceled)

213. (currently amended) A method ~~according to claim 156, for use in connection with an~~ audio/visual system, comprising:

connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

wherein each of said at least one output component includes at least one source port

for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port;

generating at least one entertainment session;

associating at least one player/recorder component with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object;

wherein the process of assigning of a program to an entertainment session includes  
[[:]] invoking a function to select an audio/visual program entry thereby returning a reference to the audio/visual program entry; and

invoking a set current program function of the entertainment session object passing the reference to the audio/visual program entry.

214-217. (canceled)

218. (currently amended) A method ~~according to claim 156~~, for use in connection with an audio/visual system, comprising:

connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

wherein each of said at least one output component includes at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port;

generating at least one entertainment session;

associating at least one player/recorder component with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object; and

wherein invoking the set current program function of an entertainment session object

passes a reference to an audio/visual program entry thereby loading that audio/visual program entry within the entertainment session.

219. (previously presented) A method according to claim 218, wherein said invoking includes:

- invoking a function to retrieve a loaded player/recorder object;
- passing a reference to the audio/visual program entry; and
- returning a reference to a player/recorder object that is loaded with the program.

220. (previously presented) A method according to claim 219, further including:

- invoking a get current source function of the player/recorder object, thereby returning a reference to a complete source port for the player/recorder object; and
- invoking a get stream reference function of the source port object to retrieve a reference to a complete stream for the source port object.

221. (previously presented) A method according to claim 220, further including:

- looping while selecting at least one output component associated with the entertainment session; and
- creating a virtual circuit from the player/recorder component to each of the output components.

222. (previously presented) A method according to claim 221, wherein said looping includes at least one of synchronous looping and asynchronous looping.

223. (previously presented) A method according to claim 221, wherein said looping includes:

- requesting a selected output component to return a sink port object that is appropriate to the type of stream;
- invoking a get sink port function of the output object corresponding to the selected output component; and
- invoking a create virtual circuit function of the source port object passing a reference to the sink port object, thereby creating a virtual circuit from the source port to the sink port.

224. (currently amended) A method ~~according to claim 156~~, for use in connection with an audio/visual system, comprising:

connecting at least one source port of at least one output component to at least one sink port of at least one input component via at least one primitive circuit path;

wherein each of said at least one output component includes at least one source port for each type of output signal output from the at least one output component and at least one source port object for each of said at least one source port;

wherein each of said at least one input component includes at least one sink port for each type of input signal input to the at least one input component and at least one sink port object for each at least one sink port;

generating at least one entertainment session;

associating at least one player/recorder component with each entertainment session including at least one output component, wherein a player/recorder component is a type of source object;

wherein the entertainment session includes a load program function to retrieve a loaded player/recorder object, which passes a reference to an audio/visual program entry and returns a reference that has been allocated to a player/recorder object, said load program includes [[:]] retrieving the location information from the audio/visual program entry;

if the location information indicates that a player/recorder component is associated with the audio/visual program entry, invoking a load function of the audio/visual program entry and receiving a reference to a loaded player/recorder object in return; and

if the location information indicates that a player/recorder component is not already associated with the audio/visual program entry, receiving a reference to the loaded player/recorder object.

225. (previously presented) A method according to claim 224, further including:

retrieving a player/recorder object that is appropriate to an associated entertainment session; and

invoking a load program function of the player/recorder object passing the reference to the audio/visual program entry.

226. (previously presented) A method according to claim 225, wherein the load function of the player/recorder object includes:

- invoking a load program function of the media manager object passing a reference to the audio/visual program entry, receiving a reference to a player/recorder object in return; and
- invoking the load program function of the player/recorder object passing the program reference.

227. (previously presented) A method according to claim 224, wherein the load program function of a player/recorder object, which is passed a reference to an audio/visual program entry and effects the loading of the program into that player/recorder component, includes:

- identifying a complete source port of the player/recorder component that is appropriate for the passed program;
- assigning the audio/visual program entry to the player/recorder object;
- determining at least one of the usage, format and port type for the primitive ports of the selected source port;
- invoking a set signal function of the complete source port passing said at least one of the usage, format and port type, thereby setting the usage, format and port type for each primitive source port; and
- notifying the audio/visual program entry that it has been loaded.

228. (previously presented) A method according to claim 226, wherein the load program function of a media manager object, which is performed when the media manager object has at least one child media manager object, includes:

- passing a reference to an audio/visual program entry and returning a reference to a player/recorder object;
- invoking a get location function of the audio/visual program entry to retrieve location information from the audio/visual program entry;
- searching a location table for a media manager object that manages the media corresponding to the audio/visual program entry; and
- invoking the load program function of the located media manager object.



229. (previously presented) A method according to claim 226, wherein the load program function of a media manager object, which is performed when the media manager object has zero child media manager objects, includes:

- retrieving location information from the audio/visual program entry and automatically finding the media associated with the location information;
- initializing an appropriate object for the media; and
- setting a return reference to the appropriate object.

230-243. (canceled)